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10/814,596	03/31/2004	David D. Shipp	03-EDP-303	5871

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EXAMINER	
HOANG, ANN THI	
ART UNIT	**PAPER NUMBER**
2836	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/814,596	SHIPP ET AL.	
	Examiner	Art Unit	
	Ann T. Hoang	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,17-20 and 26* is/are rejected.

7)☒ Claim(s) *16 and 21-25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/31/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On page 4, line 27, the trip unit should be referenced with the number 9 in order to be consistent with the drawings. On page 8, line 4, the resistor should be referenced with the number 56 in order to be consistent with the drawings. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-12, 14-15, 17-20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fitts et al. (US 4,866,557) in view of Papallo et al. (US 2003/0231440).

Regarding claim 1, Fitts et al. discloses a method of adjusting a specified trip function for responding to a fault for a circuit breaker (5) in a low voltage power circuit. The parameters of the specified trip function being adjusted include pickup current and time delay, which are adjustable between several specified settings ranging from lower to higher values via adjustment knobs (32,

34, 42, 36, 44, 38, 46). See Figs. 1 and 13; column 2, lines 7-23; column 3, lines 41-46; column 5, lines 33-39 and 66-68; column 6, lines 1-2; and column 7, lines 11-16. Fitts et al. does not disclose the method to be for providing protection against arc flash during maintenance.

However, Papallo et al. discloses a low voltage power circuit (10) including a circuit breaker (415) with adjustable time delay, and also discloses that minimizing the time delay of circuit breaker (415) is desirable in order to reduce arc energy exposure of operating and service personnel during maintenance. See page 7, paragraph 80. Additionally, it is well known and expedient in the art that a larger current flowing through a circuit breaker at the time of tripping results in a larger let-thru energy, or arc flash, and that a smaller current results in lesser arc flash. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of adjusting a specified trip function with parameters of pickup current and time delay for a circuit breaker, as disclosed by Fitts et al, with the method of minimizing arc flash during maintenance, as disclosed by Papallo et al., in order to provide a safer working environment for maintenance personnel. The lower settings for pickup current and time delay on the adjustment knobs of Fitts et al. would be the parameters of a maintenance trip function, selected during maintenance to override higher settings, which would be the parameters for a specified trip function during non-maintenance or other operations calling for higher settings. Selecting the maintenance trip function with lower parameter settings would result in reduced arc flash during tripping, as discussed above. Furthermore, it

would have been obvious to one of ordinary skill in the art at the time of the invention to restore the specified trip function following maintenance in order to resume the operation of the circuit breaker in the state in which it had functioned before maintenance, during normal operations calling for higher settings.

Regarding claim 2, Fitts et al. discloses that the specified trip function comprises a specified pickup current and a specified time delay. See column 2, lines 7-23. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises reducing at least one of the specified pickup current and the specified time delay, as mentioned above. See above rejection on claim 1.

Regarding claim 3, the combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises reducing both the specified pickup current and the specified time delay, as mentioned above. See above rejection on claim 1.

Regarding claim 4, Fitts et al. discloses that the specified trip function comprises implementing one or more of an instantaneous trip function, a short delay trip function and a ground fault trip function. See columns 5-6 and column 7, lines 11-16. Overriding the specified trip function would comprise overriding each trip function implemented, as reducing the pickup current and delay time settings for each trip function would be required to reduce arc flash associated with every trip function. See above rejection on claim 1.

Regarding claim 5, Fitts et al. discloses that the short delay trip function is implemented with a specified short delay pickup current and a specified short

delay time delay. See column 5, lines 54-68 and column 6, lines 1-2. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises eliminating the specified short delay time delay, as this value is overridden by a reduced time delay associated with the maintenance trip function, as discussed above. See above rejections on claims 1 and 4.

Regarding claim 6, Fitts et al. discloses that the short delay trip function is implemented with a specified short delay pickup current and a specified short delay time delay. These specifications are set by a user via adjustment knobs (34, 42). See Fig. 13; column 5, lines 54-68; column 6, lines 1-2; and column 7, lines 11-16. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises reducing the specifed short delay pickup current, as discussed above. See above rejections on claims 1 and 4.

Regarding claim 7, the combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function further comprises reducing specified short time delay, as mentioned above. See above rejections on claims 1 and 4.

Regarding claim 8, Fitts et al. discloses that the instantaneous trip function is implemented with a specified instantaneous pickup current. This specification is set by a user via knob (32). See Fig. 13; column 5, lines 25-44; and column 7, lines 11-16. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises reducing the specifed instantaneous pickup current, as discussed above. See above rejections on claims 1 and 4.

Regarding claim 9, Fitts et al. discloses that the ground fault trip function is implemented with a specified ground fault pickup current. This specification is set by a user via knob (38). See Fig. 13; column 6, lines 45-62; and column 7, lines 11-16. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises reducing the specifed ground fault pickup current, as discussed above. See above rejections on claims 1 and 4.

Regarding claim 10, Fitts et al. discloses that the ground fault trip function has a ground fault time delay. See column 6, lines 63-68. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function further includes reducing the ground fault time delay, as discussed above. See above rejections on claims 1 and 4.

Regarding claim 11, Fitts et al. discloses pickup current and time delay adjustment knobs (32, 34, 42, 36, 44, 38, 46) to each have a plurality of settings, at least three per knob. See Fig. 13. It would have been obvious to one of ordinary skill in the art at the time of the invention to make the two lowest settings of each adjustment knob provide two different low levels of each pickup current and time delay in order to provide a plurality of maintenance trip functions for differing maintenance operations. Overriding the specified trip function, associated with a higher setting, with a maintenance trip function, associated with the lowest settings, would comprise selecting one of a first maintenance trip function, associated with the lowest setting on each adjustment knob, that results in a first level of arc energy in the fault during a trip that is less than the arc energy resulting from the specified trip function, and a second maintenance trip

function, associated with the second lowest setting on each adjustment knob, that results in a second level of arc energy in the fault that is more than the first level of arc energy but less than the arc energy resulting from the specified trip function.

Regarding claim 12, Papallo et al. discloses that low voltage circuit (10) is multiphase. See Fig. 1 and page 2, paragraph 26. The reference also discloses that the system (26) includes protection and control schemes that consider the value of phase signals at the circuit breakers (14). See page 2, paragraph 29. It is well known and expedient in the art to trip circuit breakers in response to a current imbalance between the phases of a multiphase system, therefore it is understood that the circuit breakers (14) of Papallo et al. are tripped in response to a current imbalance in the multiple phases. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the maintenance trip function mentioned above to cause a trip in response to a current imbalance in the multiple phases in order to protect the maintenance personnel from safety hazards resulting from phase current imbalance.

Regarding claim 14, Papallo et al. discloses that system (26) incorporates a jumpered zone interlock providing a specified delay for circuit breaker (415). See page 1, paragraph 7 and page 7, paragraph 80. The combination of Fitts et al. and Papallo et al. provides that overriding the specified trip function comprises eliminating the specified delay and replacing it with a delay associated with the maintenance trip function by adjusting adjustment knobs (42, 44, 46), as mentioned above. See above rejection on claim 1.

Regarding claim 15, eliminating the specified time delay and replacing it with a reduced time delay associated with the maintenance trip function, as mentioned above, would result in tripping the circuit breaker in the jumpered zone interlock nearest to the fault after the reduced time delay. The tripping of the circuit breaker would result in open circuiting the jumpered zone interlock.

Regarding claim 17, the combination of Fitts et al. and Papallo et al. provides that the specified trip function is overridden by substituting the maintenance trip function for the specified trip function by adjusting adjustment knobs (32, 34, 42, 36, 44, 38, 46) from a higher setting to a lower setting, as discussed above. See above rejection on claim 1. Adjustment knobs (32, 34, 42, 36, 44, 38, 46) retain the parameter values of the higher settings associated with the specified trip function, and these would be restored following maintenance, as normal operation requires higher settings.

Regarding claim 18, Fitts et al. discloses a low voltage circuit breaker (5) in a protected low voltage power circuit comprising: separable contacts of circuit breaker (5); a current sensor (10) sensing current (I_1) in the protected low voltage circuit; a trip unit (4) responsive to the current sensor (10) tripping open the separable contacts in response to a specified trip function; and adjustment means (32, 34, 42, 36, 44, 38, 46) overriding the specified trip function with an adjusted trip function that results in reduced pickup current and time delay of circuit breaker (5). Overriding the specified trip function with an adjusted trip function essentially comprises turning adjustment means (32, 34, 42, 36, 44, 38, 46) to lower settings. See Figs. 1 and 13; column 2, lines 7-23; column 3, lines

41-46; column 5, lines 33-39 and 66-68; column 6, lines 1-2; and column 7, lines 11-16. Fitts et al. does not disclose that the apparatus protects from arc flash resulting from faults or that the adjusted trip function results in reduced arc energy in the fault during a trip over arc energy during a trip with the specified trip function.

However, Papallo et al. discloses a low voltage power circuit (10) including a circuit breaker (415) with adjustable time delay, and also discloses that minimizing the time delay of circuit breaker (415) is desirable in order to reduce arc energy exposure of operating and service personnel during maintenance. See page 7, paragraph 80. Additionally, it is well known and expedient in the art that a larger current flowing through a circuit breaker at the time of tripping results in a larger let-thru energy, or arc flash, and that a smaller current results in lesser arc flash. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the adjustable low voltage circuit breaker of Fitts et al. to provide protection against arc flash resulting from faults by making the adjustment means into a maintenance means, the adjusting of which results in reduced arc energy in the fault during a trip over arc energy during a trip with the specified trip function when it is turned from the specified trip function, a higher setting, to a lower setting. This would provide the advantage of having a means to reduce pickup current and time delay settings for the circuit breaker, thus reducing the risk associated with arc flash during maintenance, and providing a safer working environment for maintenance personnel.

Regarding claim 19, Fitts et al. discloses that maintenance means (32, 34, 42, 36, 44, 38, 46) comprises an adjustment knob that can be set between several parameter values. See Fig. 13 and column 5, lines 33-39. The combination of Fitts et al. and Papallo et al. provides that it is operative between a normal position selecting the specified trip function, associated with higher settings for pickup current and time delay, and a maintenance position selecting the maintenance trip function, associated with low settings for pickup current and time delay. See above rejections on claims 1 and 18. Fitts et al. does not disclose a maintenance switch, as adjustment knobs are better suited for adjustment between several settings. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a maintenance switch instead of a knob in order to provide a simpler adjustment means between a lesser number of settings, as it is well known and expedient in the art to use a switch to control operation between a small number of settings.

Regarding apparatus claim 20, the recited limitations would necessarily be provided in the performance of the above mentioned method of providing protection against arc flash. See above rejection on claim 11.

Regarding claim 26, Papallo et al. discloses that system (26) comprises a zone interlock. See page 1, paragraph 7 and page 7, paragraph 80. Fitts et al. discloses the specified trip function to include a short delay trip function with a short delay. See column 5, lines 66-68 and column 6, lines 1-2. The combination of Fitts et al. and Papallo et al. provides that the maintenance means open circuits the zone interlock and eliminates the short delay of the short

delay trip function, as initiating the maintenance means constitutes overriding the specified trip function and eliminating the short delay of the short delay trip function and tripping the circuit breaker after a reduced time delay, which results in open circuiting the zone interlock. See above rejections on claims 1 and 18.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fitts et al. (US 4,866,557) in view of Papallo et al. (US 2003/0231440), and further in view of Iriyama (JP 411155235). Neither Fitts et al. nor Papallo et al. disclose that the maintenance trip function causes a trip in response to a current reversal in the low voltage circuit. However, Iriyama discloses maintenance trip function in which a reverse current detecting circuit (1) that trips a circuit breaker (31) upon detecting a reverse current. See abstract. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the reverse current detecting circuit of Iriyama in the method of providing protection against arc flash of Fitts et al. and Papallo et al. in order to reduce danger associated with reverse currents and increase safety for maintenance personnel, as disclosed by Iriyama.

Allowable Subject Matter

5. Claims 16 and 21-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 16, prior art fails to teach the method of providing protection against arc flash mentioned above, wherein overriding a specified trip function comprises providing an independent maintenance trip function in parallel with the specified trip function.

Regarding claims 21-25, prior art fails to teach the low voltage circuit breaker protecting from arc flash mentioned above, wherein a maintenance means comprises a maintenance plug insertable in the circuit breaker to implement the maintenance trip function.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hobson, Jr. et al. (US 3,110,848) and Jencks et al. (US 3,391,361) disclose circuit breakers with adjustable pickup current. Morris et al. (US 6,252,365) discloses a circuit breaker with varying trip time delays. Spencer et al. (US 6,233,128) discloses a circuit breaker that can retain parameter information. Stevenson et al. (US 6,777,627) and Garzon et al. (US 5,933,308) disclose the danger of arc flash to maintenance personnel. Kalau et al. (US 2005/0197744) discloses a system having a maintenance mode for maintenance personnel that is terminated either after a predetermined time limit or by entering a maintenance deactivation code.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann T. Hoang, whose telephone number is

571-272-2724. The examiner can normally be reached Monday through Friday, 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached at 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ATH
1/20/06

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PRIMARY EXAMINER